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Homework 3

Due Thu 9/15 10 AM
Hand Copy

1. \[ x_{n+1} = 1 - 2x_n^2 \]
   \[ |x_0| < 1 \]
   \[ |x_0| 
eq 0.5 \]
   - What is the change in \( x_{10} \) if \( x_0 \) is changed by \( 10^{-3} \)? What is the Lyapunov exponent?
   - Make an histogram with \( n \approx 100 \) bins
   - Fit the histogram with function of your choice (until satisfied!)

2. Read Chapter 6 of Feynman’s Lectures I
   - Simulate the 90 trials of 30 tosses of a coin using 1 as your random number generator:
     \[ X_n > 0 \rightarrow \text{Head} \]
     \[ X_n < 0 \rightarrow \text{Tail} \]
   - Plot your result of Fig 6-2
   - Compare with the prediction.
   - Are the fluctuations reasonable?
   - Is 1 a good random number generator?